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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,675	03/18/2004	Michael Degner	81095340 (FGT 3F3B)	8003

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ALLEMAN HALL MCCOY RUSSELL & TUTTLE, LLP
806 S.W. BROADWAY, SUITE 600
PORTLAND, OR 97205

EXAMINER	
PATEL, DHARTI HARIDAS	
ART UNIT	PAPER NUMBER
2836	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/804,675	DEGNER ET AL.	
	Examiner	Art Unit	
	Dharti H. Patel	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 January 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,11,13 and 15-24* is/are rejected.

7)☒ Claim(s) *10,12,14,25 and 26* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-9, 11, 13, and 15-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Kuehn, III, Patent No. 3,884,207.

With respect to claim 1, Kuehn discloses an electronic circuit [Fig. 1] comprising a first electromechanical actuator coil [Fig. 1, 18] coupled to a cylinder valve of an internal combustion engine [col. 2 lines 43-46, lines 55-57], a second electromechanical actuator coil [Fig. 1, 20], where a first end of said second electromechanical actuator coil is coupled to a common reference with a first end of said first electromechanical actuator coil [Fig. 1, the common reference is the node between the coils 18 and 20, and both first ends of coils 18 and 20 are connected to this common reference node]; a first energy storage device [Fig .1, 32], where a first end of said first energy storage device is coupled to said common reference [Fig. 1; one end of the capacitor 32 is connected to the common reference node]; and a second energy storage device [Fig. 1, 34], where a first end of said second energy storage device is coupled to said

common reference [Fig. 1; one end of the capacitor 34 is connected to the common reference node].

With respect to claim 2, Kuehn discloses that the first energy storage device is a first capacitor [Fig. 1, 32].

With respect to claim 3, Kuehn discloses that the second energy storage device is a second capacitor [Fig. 1, 34].

With respect to claim 4, Kuehn further comprises a voltage source [Fig. 1, 46; col. 4 lines 1-4], with a first end of said source coupled to a second end of said first energy storage device [Fig. 1, 32; the positive polarity + of voltage source 46 is connected to the second end of the first energy storage device 32].

With respect to claim 5, Kuehn discloses that a second end of said source [Fig. 1, negative polarity – of voltage source 46] is coupled to a second end of said second energy storage device [Fig. 1, 34; the negative polarity – of the voltage source 46 is connected to the second end of the second energy storage device 34].

With respect to claim 6, Kuehn further comprises a first one-way current device [Fig. 4, upper diode], with a first end of said one way current device coupled to a second end of said first electromechanical coil [Fig. 1; cathode of upper diode in Fig. 4 is connected to the second end of the first electromechanical coil 18].

With respect to claim 7, Kuehn further comprises a second one-way current device [Fig. 4, lower diode], with a first end of said one-way current

device coupled to a second end of said second electromechanical actuator coil [Fig. 1; cathode of lower diode in Fig. 4 is connected to the second end of the second electromechanical coil 20].

With respect to claim 8, Kuehn further comprises a first switch [Fig. 1, 26] for actuating said first electromechanical actuator coil [Fig. 1, 18; col. 3 lines 64-67]; and a second switch [Fig. 1, 30] for actuating said second electromechanical actuator coil [Fig. 1, 20].

With respect to claim 9, Kuehn discloses a system [Fig. 1], comprising a dual-coil half bridge converter adapted to be coupled to a single or multiple coil actuator of a cylinder valve, the cylinder valve in an internal combustion engine [col. 2 lines 43-46, lines 55-57], the converter having a first and second capacitor [Fig. 1, capacitors 32 and 34] and a voltage source [Fig. 1, 46, col. 4 lines 1-4], with at least one end of each of the first and second capacitors coupled to a common reference [Fig 1; both first ends of the capacitors 32 and 34 are connected to common reference], the converter actuated via switches [Fig. 1, 26 and 30] to individually energize coils in said dual coil actuator, wherein at least one end of said actuator is coupled to said common reference [Fig. 1; both first ends of the coils 18 and 20 are connected to common reference].

With respect to claim 11, Kuehn discloses that the converter is adapted to be coupled to a plurality of engine cylinder valves [col. 2 lines 43-46, lines 55-57].

With respect to claim 13, Kuehn discloses that the capacitors form a dual voltage source [col. 4, lines 1-9].

With respect to claim 15, Kuehn discloses a dual coil half bridge power converter system, comprising a power source [Fig. 1, 46]; a single or multiple coil actuator of a cylinder valve [col. 2, lines 43-46, lines 55-57], the cylinder valve in an internal combustion engine, only one actuating switch [Fig. 1, 26] for actuating each coil [Fig. 1, coils 18 and 20] in said actuator; and an energy storage device [Fig .1, 32] for storing energy during deactivation of at least one coil [col. 3, lines 12-17].

With respect to claim 16, Kuehn further comprises a unidirectional current device [Fig. 4, upper diode] for allowing freewheeling current during deactivation of at least one coil [Fig. 1, Fig. 1, 18].

With respect to claim 17, Kuehn discloses that the storage device includes two capacitors in a split voltage power supply topology [Fig. 1, 32 and 34].

With respect to claim 18, Kuehn discloses that the energy storage device includes two capacitors [Fig. 1, 32 and 34] in a boosted power supply topology.

With respect to claim 19, Kuehn further comprises a plurality of dual coil actuators of cylinder valves of an engine [col. 2, lines 43-46, lines 55-57], and only one actuating switch [Fig. 1, 26] coupled to each coil [Fig. 1, coils 18 and 20] of said plurality of coils [Fig. 1, 18 and 20].

With respect to claim 20, Kuehn discloses a system [Fig. 1] comprising a power supply [Fig. 1, 46; col. 4, lines 1-4] with a positive and negative terminals [Fig. 1, + and – terminals]; a first coil [Fig. 1, 18] coupled to a cylinder valve actuator of an engine, said first coil [Fig. 1, 18] having a first end and a second

end; a first switch [Fig. 1, 26] coupled between a first end of said coil and said positive terminal of said power supply [Fig. 1; switch is between common reference and + terminal of 46]; a first capacitor [Fig. 1, 32] coupled between said positive terminal of said power supply [Fig. 1, + terminal of 46] and said second end of said first coil [Fig. 1, 18]; a first diode [Fig. 4, upper diode] coupled between said first end of said first coil [Fig. 1, 18] and said negative terminal [Fig. 1, - terminal of 46]; a second coil [Fig. 1, 20], said second coil having a first end and a second end, said first end of said second coil coupled to said second end of said first coil [Fig. 1, 18]; a second capacitor [Fig. 1, 34] coupled between said first end of said second coil and said negative terminal [Fig. 1, - terminal of 46]; a second switch [Fig. 1, 30] coupled between said second end of said second coil and said negative terminal; and a second diode [Fig. 4, lower diode] coupled between said second end of said second coil and said positive terminal.

With respect to claim 21, Kuehn discloses that the negative terminal of said power supply is coupled to a ground [Fig. 1, - polarity is usually negative power or ground].

With respect to claim 22, Kuehn discloses that the switches [Fig. 1, 26 and 30] control actuation of at least one cylinder valve of an internal combustion engine [col. 3 lines 12-15, lines 65-68].

With respect to claim 23, Kuehn discloses that the second coil [Fig. 1, 18is coupled to said cylinder valve actuator [Fig. 1; col. 2 lines 43-46].

With respect to claim 24, Kuehn discloses that the second coil [Fig. 1, 20] is coupled to another cylinder valve actuator of said engine [Fig. 1; col. 2 lines 43-46].

Allowable Subject Matter

Claims 10, 12, 14, and 25-26 are objected as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for indicating allowance of claim 10: The prior art does not disclose that the dual-coil half bridge converter maintains a charge balance on said first and second capacitor. This feature in combination with the rest of the claim limitations is not anticipated or rendered obvious by the prior art of record.

The following is an examiner's statement of reasons for indicating allowance of claim 12: The prior art does not disclose that the dual coil half bridge converter maintains a charge balance on said first and second capacitor even when at least one cylinder of the engine is deactivated while at least one other cylinder carries out combustion. This feature in combination with the rest of the claim limitations is not anticipated or rendered obvious by the prior art of record.

The following is an examiner's statement of reasons for indicating allowance of claim 14: The prior art does not disclose that the dual coil half bridge converter is adapted to be coupled to at least two dual coil actuators of

two cylinder valves, wherein the converter is configured to balance voltage of said first and second capacitor. This feature in combination with the rest of the claim limitations is not anticipated or rendered obvious by the prior art of record.

The following is an examiner's statement of reasons for indicating allowance of claim 25: The prior art does not disclose that the system further comprises third and fourth coils, wherein said system is configured to balance voltage across said first, second, third, and fourth coils. This feature in combination with the rest of the claim limitations is not anticipated or rendered obvious by the prior art of record.

Response to Arguments

Applicant's arguments filed 01/18/2007 have been fully considered but they are not persuasive.

Applicant's arguments with respect to claims 1-26 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory

action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dharti H. Patel whose telephone number is 571-272-8659. The examiner can normally be reached on 8:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on 571-272-2800, Ext. 36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service

Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DHP
04/13/2007

Stephen W Jackson 4-13-07

STEPHEN W. JACKSON
PRIMARY EXAMINER